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בקשה לפטנט  
Application for Patent

אני, (שם המבקש, מענו ולגבי גוף מאוגד - מקום ההתאגדות)  
I (Name and address of applicant, and in case of body corporate-place of incorporation

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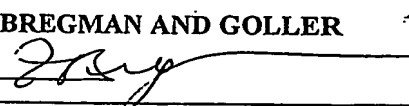
(בעברית)  
(Hebrew)

CRASH BARRIERS FOR ROADS AND METHOD FOR ASSEMBLING SAME

(באנגלית)  
(English)

hereby apply for a patent to be granted to me in respect thereof.

מבקש בזאת כי ינתן לי עליה פטנט

* בקשה חלוקה - Application for Division		* בקשה פטנט מוסף - Application for Patent of Addition		* דרישה דין קדימה Priority Claim		
מבקשת פטנט From Application		לבקשה/לפטנט to Patent/Appl.		מספר / סימן Number / Mark	תאריך Date	מדינת האגוד Convention Country
No. dated	מס' מיום	No. dated	מס' מיום			
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CRASH BARRIERS FOR ROADS AND METHODS  
FOR ASSEMBLING SAME

מחיצות התנגשות לכבישים ושיטה להרכבתם

## Field of the Invention

The present invention relates to crash barriers for roads and highways, and more particularly, to crash barrier assemblies made of prismatic elements and to a method for assembling such barriers.

## Background of the Invention

Solid crash barriers made of concrete are built along the roads, either by *in situ* casting or by interconnecting the side surfaces of individual prefabricated elements to each other, e.g., by means of male/female connectors, steel hooks and loops, etc., as *per se* known.

There are several disadvantages to the above-mentioned prior art crash barriers, the first being the rigidity of the barriers as compared with barriers made, e.g., of steel rails or cables. A second disadvantage is that it is very difficult and time-consuming to achieve a smooth, contiguous upper edge at the desired level of the interconnected individual prefabricated elements forming these barriers.

## Summary of the Invention

It is therefore a broad object of the present invention to provide crash barrier elements for roads and highways and a method for assembling same which ameliorates the disadvantages of prior art barriers of the same type.

It is a further object of the present invention to provide a crash barrier assembly erected from individual solid building elements which provide a smooth, contiguous surface in both the vertical and horizontal surfaces and edges.

It is a still further object of the present invention to provide a crash barrier assembly made of interconnected individual solid building elements including energy-absorbing material, providing a barrier having controllable elasticity upon impact by a vehicle.

In accordance with the invention, there is therefore provided a crash barrier assembly, comprising a plurality of prismatic, solid structural elements, at least one of the elements having a shoulder forming a horizontal surface on at least one of its sides, and another element having substantially matching surfaces on at least one of its sides so as to facilitate juxtaposing of the elements, and coupling means for resiliently interconnecting the elements to each other in a manner facilitating relative controlled movement along the horizontal surface of the one element with respect to the other about the coupling means.

The invention further provides a method for erecting a crash barrier, comprising providing a plurality of elements as described herein, juxtaposing at least two of the elements, and interconnecting the elements by driving a rod through the elements.

### **Brief Description of the Drawings**

The invention will now be described in connection with certain preferred embodiments with reference to the following illustrative figures so that it may be more fully understood.

With specific reference now to the figures in detail, it is stressed that the particulars shown are by way of example and for purposes of illustrative discussion of the preferred embodiments of the present invention only, and are presented in the cause of providing what is believed to be the most useful and readily understood description of the principles and conceptual aspects of the invention. In this regard, no attempt is made to show structural details of the invention in more detail than is necessary for a fundamental understanding of the invention, the description taken with the drawings making apparent to those skilled in the art how the several forms of the invention may be embodied in practice.

In the drawings:

Figs. 1A and 1B are isometric views of two embodiments of juxtaposed crash barriers according to the present invention;

Fig. 2 is a schematic, longitudinal cross-sectional view illustrating the interconnection between the barrier elements of Figs. 1A and 1B;

Fig. 3 shows a preferred embodiment of the barrier of Fig. 2;

Fig. 4 illustrates a modification of the embodiment of Fig. 3;

Fig. 5 shows a further embodiment of the invention, and

Fig. 6 is an enlarged view of a detail of Fig. 5.

### Detailed Description

Figs. 1A and 1B illustrate isometric views of two embodiments of a crash barrier 2 for roads and highways. Barrier 2 is assembled from juxtaposed, prismatic structural elements, e.g., the general trapezoidal elements 4, 6, 8 or 4', 6', 8'. The elements may be configured in many ways, e.g., having a general trapezoidal shape, as shown, or may advantageously be symmetrical with respect to their top, bottom and side surfaces, so as to enable their positioning in reverse orientations, e.g., elements 8 and 8'.

As further seen in the Figures, the characterizing feature of the elements are the shoulders 10, which serve as inter-engagement surfaces with an adjacent element or elements.

Referring to Fig. 2, shown are portions of two juxtaposed elements 4 and 6, interconnected by coupling means consisting of a pin or rod 12 traversing the upper portion 14 of element 4 and entering into a lower portion 16 of element 6. The connecting surfaces between elements 4 and 6 are along the horizontal planes of the elements.

Fig. 3 schematically illustrates a preferred embodiment of the invention, in which two juxtaposed elements 4 and 6 are interconnected by means of a rod 16 extending into a bore 18 lined by a cup 20, at least partly filled with energy-absorbing material 22, e.g., neoprene, rubber, Teflon®, a metallic, sponge-like body, one or more metallic springs, or like elastic materials. As seen in Fig. 4, in addition to, or

instead of the energy-absorbing material 22 in the lower portion of an element, the energy-absorbing material may be located around rod 12, traversing the upper portion 14 of the element 4.

Hence, as will be understood, when a vehicle crashes into a barrier 2 constructed according to the present invention, the impacted element will absorb and soften the blow at least to some extent, before bringing the crashing vehicle to a stop. Obviously, the strength of the elements and the rods, and the resiliency of the coupling means between the elements can be predetermined and adapted to different road hazards, the types of vehicles travelling along the road, and their speed. Any impact will thus cause a controlled movement of one element about the coupling means, along the horizontal surface 10 with respect to another, adjacent element.

A further embodiment of the invention is shown in Fig. 5. In this embodiment, the energy-absorbing material 22 is a hydraulic fluid such as oil. Accordingly, rod 12 is constituted by a tube 24 having at its top a removable plug 26, facilitating the introduction of hydraulic fluid into the tube after the barrier 2 is assembled. Advantageously, plug 26 may be a pressure-sensitive plug 28 (Fig. 6). This type of elastic coupling means also necessitates a seal 30 for sealing off the cup 20. The inner diameter of the tubular rod 24, the type of hydraulic fluid and pressure-sensitive plug 28 will determine, *inter alia*, the energy-absorbing capability of the crash barrier assembly. Plug 28 can also be positioned at the bottom of the tube 24.

The gaps between the horizontal and vertical interconnecting surfaces of the juxtaposed elements can be filled in with suitable filling materials having various degrees of resiliency.

While the shown embodiments illustrate a symmetrical crash barrier assembly especially suited to be erected between two roads, it should be understood that the same type of assembly can also be performed with barrier elements configured to absorb crashes from one side only, namely, non-symmetrical elements.

It will be evident to those skilled in the art that the invention is not limited to the details of the foregoing illustrated embodiments and that the present invention may be embodied in other specific forms without departing from the spirit or essential attributes thereof. The present embodiments are therefore to be considered in all respects as illustrative and not restrictive, the scope of the invention being indicated by the appended claims rather than by the foregoing description, and all changes which come within the meaning and range of equivalency of the claims are therefore intended to be embraced therein.



**WHAT IS CLAIMED IS:**

1. A crash barrier assembly, comprising:  
a plurality of prismatic, solid structural elements, at least one of said elements having a shoulder forming a horizontal surface on at least one of its sides, and another element having substantially matching surfaces on at least one of its sides so as to facilitate juxtaposing of said elements, and  
coupling means for resiliently interconnecting said elements to each other in a manner facilitating relative controlled movement along the horizontal surface of said one element with respect to the other about said coupling means.
2. The crash barrier assembly as claimed in claim 1, wherein said elements are generally trapezoidal in shape.
3. The crash barrier assembly as claimed in claim 1, wherein said coupling means constitute a rod interconnecting two juxtaposed elements and traversing said horizontal surface.
4. The crash barrier assembly as claimed in claim 3, wherein said rod is embedded in energy-absorbing material within at least one of said elements.
5. The crash barrier assembly as claimed in claim 4, wherein said energy-absorbing material is selected from the group comprising neoprene, rubber, teflon, metallic sponge, a metal spring or springs, or hydraulic fluid.
6. The crash barrier assembly as claimed in claim 3, wherein said coupling means further comprises a cup-lined bore in said horizontal surface, into which said rod extends.
7. The crash barrier assembly as claimed in claim 6, wherein said rod is tubular, facilitating the introduction therein of fluid.

8. The crash barrier assembly as claimed in claim 7, said rod further comprising:  
a removable plug for the introduction of hydraulic fluid, and a seal for sealing off said cup.
9. The crash barrier assembly as claimed in claim 8, wherein said plug is a pressure-sensitive plug.
10. A method for erecting a crash barrier, said method comprising the steps of:  
providing a plurality of elements according to claim 3;  
juxtaposing at least two of said elements, and  
interconnecting said elements by driving said rod through said elements.
11. The method as claimed in claim 10, further comprising the steps of:  
forming a bore in said horizontal surface, and  
introducing energy-absorbing material into said bore.
12. The method as claimed in claim 10, wherein said rod is tubular, said method further comprising the steps of:  
introducing energy-absorbing fluid into said tubular rod, and  
closing said rod at its top with a plug.
13. A crash barrier assembly as claimed in claim 1, substantially as hereinbefore described and with reference to the accompanying drawings.
14. A method for erecting a crash barrier as claimed in claim 10, substantially as hereinbefore described and with reference to the accompanying drawings.

for the Applicant:

**WOLFF, BREGMAN AND GOLLER**

by: 

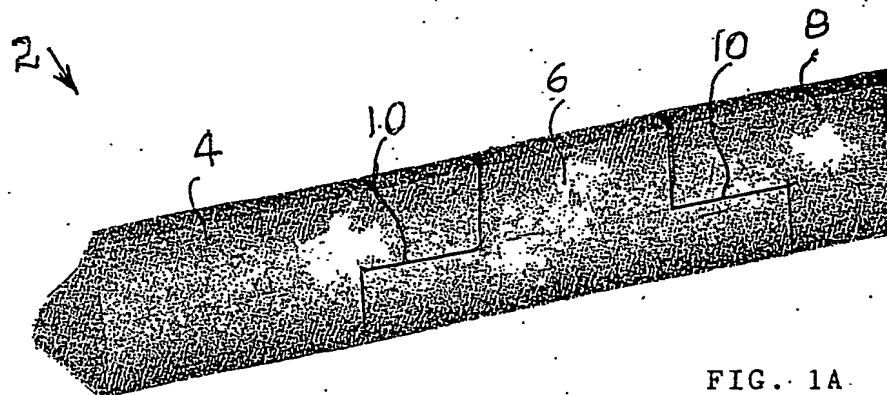


FIG. 1A

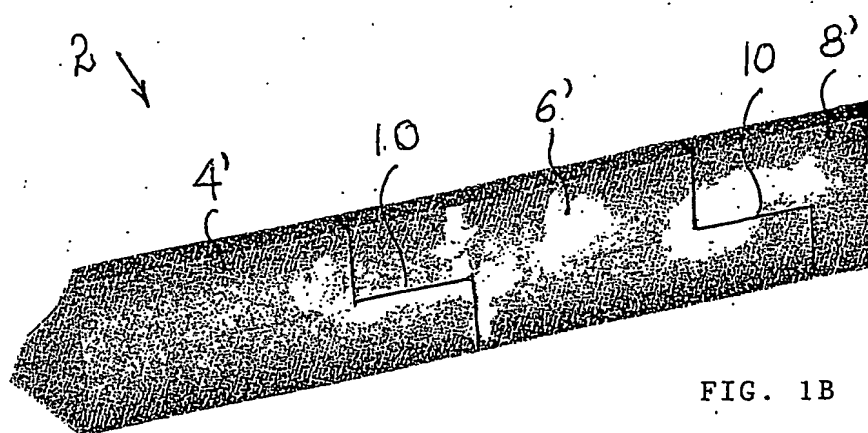


FIG. 1B

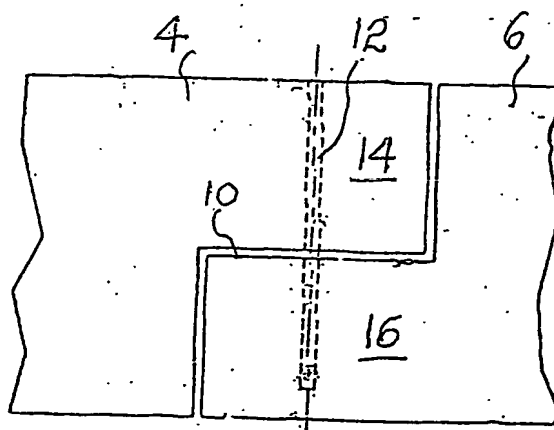


FIG. 2

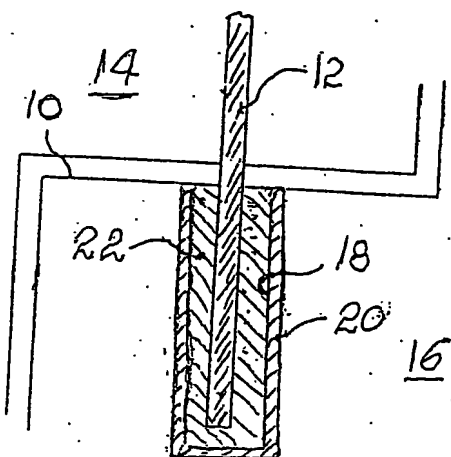


FIG. 3

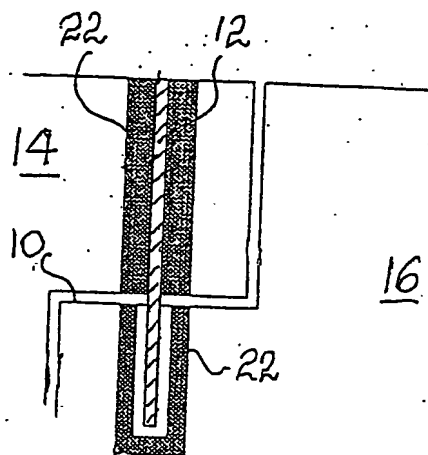


FIG. 4

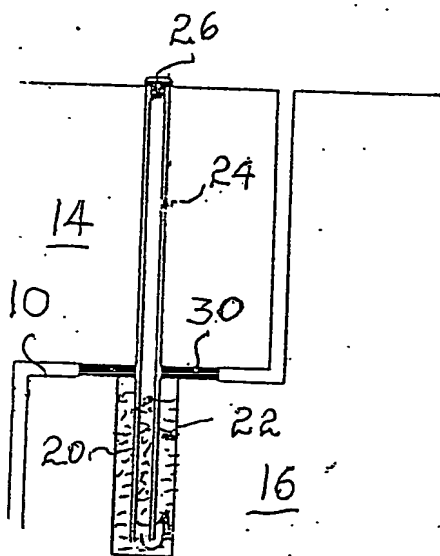


FIG. 5

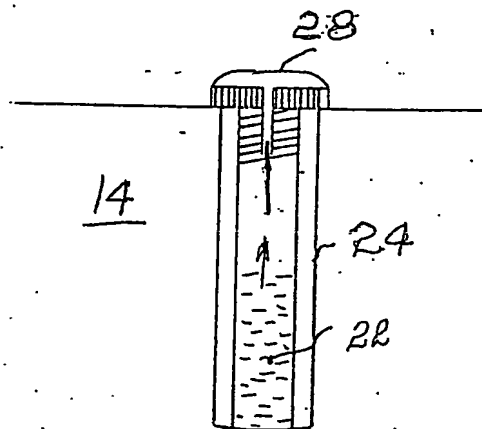


FIG. 6